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Terry M. Turpin

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MORRISON & FOERSTER LLP  
1650 TYSONS BOULEVARD  
SUITE 400  
MCLEAN, VA 22102

EXAMINER

SHIFERAW, ELENI A

ART UNIT

PAPER NUMBER

2436

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/715,824	<b>Applicant(s)</b> TURPIN, TERRY M.	
	<b>Examiner</b> ELENI A. SHIFERAW	<b>Art Unit</b> 2436	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on 09 February 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

1. Claims 1-16 are pending.

#### *Response to Amendment*

2. The abandonment of copending application No. 11632635 has been noticed in response to provisional type double patenting (DP) rejection, and the rejection to DP has been withdrawn.
3. No amendment has been done on filing a response argument on 02/09/2009.

#### *Response to Amendment 02/09/2009*

Applicant's arguments on 2/9/09 are fully considered and argument for some are moot in view of new grounds of rejection is presented below and not persuasive for some arguments as shown below. **However the examiner thoroughly considered every applicant's arguments, the claimed limitations in the claims and the invention with the applicant regards and suggested allowable subject matter at the end of this office action below to move the case forward and expedite the process.**

Regarding argument no teachings of Jackson of dividing an optical signal into a first plurality of spectral sub-bands, argument is not persuasive because Jackson teaches a method of imprinting a package of digital data on a carrier light beam by using two-dimensional spatial light modulator and securing the light beam/analogue optical signal by encrypting it (see col. 3 lines 46-64 and abstract), Jackson also teaches a first electronic device electronically connected

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to a first spatial light modulator operating to split the first serial digital data stream into a first portion and a second portion and a combiner operating to combine the first portion of said first serial digital data stream and the encrypted serial digital data stream (see claim 21) that reads on dividing optical signal into first plurality of sub-bands. Moreover the 3/12/08 Office Action discloses this limitation on page 4 par. 5 lines 6-7 and page 3 lines 9-13. *For argument sake if applicant is reading Jackson's divided information as not optical data but time domain data as argued on page 4 of the remark, the examiner combines Abbott et al. as shown below.*

Regarding argument Jackson failure to teach modifying each of a first plurality of spectral sub-bands to encrypt information contained in an optical signal, argument is not persuasive because Jackson discloses an analog optical encryption system based on phase scrambling of two-dimensional optical images and holographic transformation for achieving large encryption keys and high encryption speed. An enciphering interface uses a spatial light modulator for converting a digital data stream into a two dimensional optical image. The optical image is further transformed into a hologram with a random phase distribution. The hologram is converted into digital form for transmission over a shared information channel. A respective deciphering interface at a receiver reverses the encrypting process by using a phase conjugate reconstruction of the phase scrambled hologram (**fig. 2A**, col. 4 lines 11-49, abstract, and col. 11 lines 9-54).

Regarding argument Jackson failure to teach combining a modified first plurality of spectral sub bands into a combined optical signal, argument is not persuasive because the second electro-optical spatial light modulator receives the **second signal light beam and**

**configured to encrypt and a first signal light beam also received and combined to produce a third beam** (see claims 17-18 and fig. 2A).

Regarding argument Jackson failure to teach dividing a combined optical signal into a second plurality of spectral sub-bands and modifying each of a second plurality of spectral sub-bands to decrypt previously encrypted information argument is not persuasive because performing decryption by converting the optically encrypted and divided sequential digital data into two dimensional holograms (see col. 11 lines 21-28, col. 9 lines 65-col. 10 lines 4). Jackson further discloses modifying each second plurality of signal data and encrypting is taught on claim 16 and col. 4 lines 11-19.

Regarding argument there is no teaching wherein “each second plurality of spectral sub-bands must be modified to decrypt the previously encrypted information contained in the optical signal” for claim 16 argument is not persuasive because Jackson further discloses modifying each of a second plurality of spectral sub-bands to decrypt previously encrypted information argument is not persuasive because performing decryption by converting the optically encrypted and divided sequential digital data into two dimensional holograms (see col. 11 lines 21-28, col. 9 lines 65-col. 10 lines 4 and col. 4 lines 11-19).

The examiner is not trying to teach the invention but is merely trying to interpret the claim language in its broadest and reasonable meaning. Therefore, the examiner asserts that the system of the prior arts teach or suggest the subject matter as recited in independent claims **1 and 9**. Dependent claims are also rejected at least by virtue of their

dependency on independent claims and by other reason set forth in this office action dated **May 18, 2009**. Accordingly, rejections for claims **1-16** are respectfully maintained.

***Claim Rejections - 35 USC § 101***

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims (1-8) are rejected under 35 U.S.C. 101 based on Supreme Court precedent and recent Federal Circuit decisions, a 35 U.S.C § 101 process must (1) be tied to a particular machine or (2) transform underlying subject matter (such as an article or materials) to a different state or thing. In re Bilski et al, 88 USPQ 2d 1385 CAFC (2008); Diamond v. Diehr, 450 U.S. 175, 184 (1981); Parker v. Flook, 437 U.S. 584, 588 n.9 (1978); Gottschalk v. Benson, 409 U.S. 63, 70 (1972); Cochrane v. Deener, 94 U.S. 780,787-88 (1876).

An example of a method claim that would not qualify as a statutory process would be a claim that recited purely mental steps. Thus, to qualify as a § 101 statutory process, the claim should positively recite the particular machine to which it is tied, for example by identifying the apparatus that accomplishes the method steps, or positively recite the subject matter that is being transformed, for example by identifying the material that is being changed to a different state.

Here, applicant's method steps are not tied to a particular machine and do not perform a transformation. Thus, the claims are non-statutory.

The mere recitation of the machine in the preamble with an absence of a machine in the body of the claim fails to make the claim statutory under 35 USC 101. *Note the Board of Patent Appeals Informative Opinion Ex parte Langemyer et al.*

6. Claims 9-16 are rejected under 35 U.S.C. 101 for failing to fall under the four statutory categories. The system claim(s) fail to disclose any hardware element in the body of the claims.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 1, and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson 5793871 in view of Abbott et al. US PG. Pubs. 2001/0028758 A1.**

Regarding claim 1, Jackson discloses a method for secure transmission of an information-containing optical signal in a reflective/transmissive architecture (fig. 2-5, col. 8 lines 37-67 and col. 1 lines 11-16), comprising:

dividing the optical signal **(data)** into a first plurality of spectral sub-bands (claim 21, col. 3 lines 46-64 **and col. 6 lines 11-66**),

modifying each of the first plurality of spectral sub-bands to encrypt the information contained in the optical signal (abstract, **fig. 2A**, col. 4 lines 11-49, and col. 11 lines 9-54),

combining the modified first plurality of spectral sub-bands into a combined optical signal (claim 17-18, **fig. 2A** and col. 11 lines 21-28),

dividing the combined optical signal into a second plurality of sub-bands (claim 17-18, col. 9 lines 65-col. 10 lines 4, **fig. 2-5**, and col. 11 lines 21-28),

modifying each of the second plurality of spectral sub-bands to decrypt the previously encrypted information contained in the optical signal (claim 16, **fig. 2-5**, and col. 4 lines 11-19).

The applicant strongly believes and argues that Jackson is not dividing optical data but time domain data as argued on page 4 of the response submitted on 02/09/2009.

However Abbott et al. discloses a dispersion compensator splitting a bandwidth of the optical signals into a series of bands (see par. 0018 and abstract).

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the teachings within the system of Jackson because they are analogous in analog optical data transmission. One would have been motivated to incorporate the teachings incorporate it within a system of optical signal to improve the optical data transmission.

Regarding claim 6 Jackson discloses the method wherein at least one of the steps of modifying each of the first plurality of spectral sub-bands and modifying each of the second plurality of spectral sub-bands comprises at least one of imparting a phase shift to each sub-band, imparting a time delay to each sub-band, and imparting a frequency shift to each sub-band (col. 9 lines 45–col. 10 lines 4).



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Regarding claim 7 Jackson teaches the method comprising at least one of imparting a phase shift to each sub-band, imparting a time delay to each sub-band, and imparting a frequency shift to each sub-band at a rate that changes over time (col. 9 lines 45–col. 10 lines 4).

Regarding claim 8 Jackson teaches the method comprising imparting a frequency shift to the input information-containing optical signal (fig. 2-5).

9. **Claims 9-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson 5793871 in view of Abbott et al. US PG. Pubs. 2001/0028758 A1 and Chen et al. 7146109 B2.**

Regarding claim 9 discloses a system for secure transmission of an information-containing optical signal (fig. 2-5), comprising:

to enable division of the optical signal (**data**) into a first plurality of spectral sub-bands (claim 21, col. 3 lines 46-64 **and col. 6 lines 11-66**),

at least a first phase modulator configured to enable modification of each of the first plurality of spectral sub-bands to encrypt the information contained in the optical signal (abstract, col. 4 lines 11-49, **fig. 2A**, and col. 11 lines 9-54), to enable combining the modified first plurality of sub-bands into a combined optical signal (claim 17-18, and col. 11 lines 21-28),

to enable division of the combined optical signal into a second plurality of spectral sub-bands (claim 17-18, **fig. 2-5**, col. 9 lines 65-col. 10 lines 4, and col. 11 lines 21-28),

at least a second phase modulator configured to enable modification of each of the second plurality of spectral sub-bands to decrypt the information previously encrypted, to enable combining the modified second plurality of sub-bands into a combined optical signal (claim 16, **fig. 2-5**, and col. 4 lines 11-19).

The applicant strongly believes and argues that Jackson is not dividing optical data but time domain data as argued on page 4 of the response submitted on 02/09/2009.

However Abbott et al. discloses a dispersion compensator splitting a bandwidth of the optical signals into a series of bands (see par. 0018 and abstract).

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the teachings within the system of Jackson because they are analogous in analog optical data transmission. One would have been motivated to incorporate the teachings to improve the optical data transmission.

Jackson and Abbott fail to explicitly using optical tapped delay line. However Chen discloses an optical modulation signal transmission based on optical tapped delay line (col. 3 lines 53-67). Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to combine the teachings of Chen et al. within Jackson and Abbott because they are analogous in optical data transmission. One would have been motivated to incorporate the teachings because it would spatially resolve the wavelengths in an optical signal based on tapped optical delay signal.

Regarding claim 10 the combination discloses the system comprising: at least a third OTDL

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configured to enable division of each of the first plurality of spectral sub-bands into a plurality of finer sub-bands, and wherein at least the first phase modulator is configured to enable modification of each of the plurality of finer spectral sub-bands to encrypt the information contained in the optical signal (Chen et al. col. 3 lines 53-67 and fig. 4-5, and Jackson col. 4 lines 11-49, and col. 11 lines 9-54)

Regarding claim 11, Jackson teaches the system wherein at least one of the first and second phase modulator comprises a reflective phase modulating array (fig. 4-5).

Regarding claim 12, Jackson teaches the system wherein at least one of the first and second phase modulator comprises a transmissive phase modulating array (fig. 4-5).

Regarding claim 13, Jackson teaches the system comprising at least one computer for controlling at least one of modification of the first plurality of sub-bands by the first phase modulator and modification of the second plurality of sub-bands by the second phase modulator (col. 3 lines 32-45).

Regarding claim 14, wherein at least one of the first and second phase modulator comprises at least one of a liquid crystal array, a micro electromechanical system device, an array of III-V or II-VI semiconductor devices, the examiner takes an official notice as a well known in the art at the time of the invention (see Towler et al. USPN 6045715 col. 1 lines 11-20, and Bloom et al. 5311360 col. 3 lines 10-29). It would have been obvious to one having ordinary skill in the art at

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the time of the invention was made to combine the teachings because they are analogous in optical signal transmission. One would have been motivated to do so because it would low cost display application.

Regarding claim 15, the combination discloses the system wherein at least a first pair of OTDL configured to enable division of the optical signal into a first plurality of sub-bands (Chen et al. fig. 4, and Jackson claim 21, and col. 3 lines 46-64), at least a second pair of OTDL configured to enable division of the combined optical signal into a second plurality of spectral sub-bands, wherein at least one of the first and second phase modulator comprises a transmissive phase modulating array (Jackson fig. 4-5, and Chen et al. col. 3 lines 46-64). The rationale for combining are the same as claim 9 above.

Regarding claim 16, Jackson discloses the system wherein the first phase modulator is configured to enable modification of each of the first plurality of sub-bands by at least one of imparting a phase shift to each spectral sub-band, imparting a time delay to each sub-band, and imparting a frequency shift to each spectral sub-band, and wherein the second phase modulator is configured to enable modification of each of the second plurality of sub-bands at least one of imparting a phase shift to each spectral sub-band, imparting a time delay to each spectral sub-band, and imparting a frequency shift to each sub-band (col. 9 lines 45–col. 10 lines 4, **col. 11 lines 21-28, col. 9 lines 65–col. 10 lines 4, claim 16 and col. 4 lines 11-19**).

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**10. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson 5793871 and Abbott et al. US PG. Pubs. 2001/0028758 A1 and further in view of USPN Krause 4448529.**

Regarding claim 2, Jackson and Abbott fail to disclose wherein the information-containing optical signal has a bandwidth and at least one of the first and second plurality of sub-bands has a sub-band resolution at least 50 times finer than the bandwidth of the information-containing optical signal. However Krause teaches having many large number of spaces or optical transmitting regions in order to achieve a good resolution (see col. 6 lines 37-53, col. 9 lines 54-63, col. 10 lines 19-29, and col. 8 lines 46-53). Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to employ the teachings of Krause within the system of Jackson and Abbott because they are analogous in optical data transmission. One would have been motivated to do so because it would make high resolution.

**11. Claims 3 and 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson 5793871 and Abbott et al. US PG. Pubs. 2001/0028758 A1 and further in view of Young et al. 20060291859 A1.**

Regarding claim 3 Jackson and Abbott et al. fail to disclose how information-containing optical signal is transmitted at a bit rate. However Young et al. discloses a method wherein the information-containing optical signal is transmitted at a bit rate of not less than 1 gigabit per second (par. 0005). Therefore it would have been obvious to one having ordinary skill in the art

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at the time of the invention was made to combine the teachings of Young et al. within the system of Jackson et al. and Abbott et al. because they are analogous in optical data transmission. One would have been motivated to incorporate the teachings because it was well known at the time of the invention to transmit optical data at a bit rate of not less than 1 gbps for faster transmission.

Regarding claim 4, Young et al. teaches the method wherein the information-containing optical signal is transmitted at a bit rate of not less than 10 gigabits per second (Young et al. par. 0005), and the examiner takes an official notice wherein at least the first plurality of sub-bands comprise not less than 50 sub-bands and wherein at least the first plurality of spectral sub-bands has a spatial resolution at a focal plane of not greater than 200 MHz because it is well known at the time of the invention.

**12. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson 5793871 and Abbott et al. US PG. Pubs. 2001/0028758 A1 and further in view of Soref et al. 6114994.**

Regarding claim 5, Jackson et al. and Abbott et al. fail to teach sub-bands not less than 100. However Soref et al. discloses the method wherein the first plurality of sub-bands comprise not less than 100 sub-bands (claim 4b; optical modulator dividing input data into n spectral sub-bands). Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to combine the teachings because it would n spectral sub-bands more than 100 for secure transmission.

*Allowable Subject Matter*

**13. Claim 16 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 101, set forth in this Office action and to include all of the limitations of the base claim and to include paragraph [0027] of the applicant's disclosure.**

**14. Claim 1 would be allowable if re-written consistent with claim 16 as suggested i.e. combining claim 16, OTDL, and par. 0027 of applicant's disclosure to base claim 1, fixing 101 problem.**

*Conclusion*

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicant is advised to look at these references, 2003/0128845, 6,380,547 and 4,359,736, for disclosing for most of argued subject matters to name a few.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eleni A. Shiferaw whose telephone number is 571-272-3867. The examiner can normally be reached on Mon-Fri 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nasser R. Moazzami can be reached on (571) 272-4195. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Eleni A Shiferaw/  
Examiner, Art Unit 2436